BEFORE THE
PUBLIC SERVICE COMMISSION
OF SOUTH CAROLINA

DOCKET NO. 2011-47-WS

In the Matter of:

Application of Carolina Water Service, Inc. for)
adjustment of Rates and Charges and Modification)
of Certain Terms and Conditions for the Provision)
of Water and Sewer Service)

Prepared Direct Testimony

of

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Principal
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On Behalf of the

Carolina Water Service, Inc.

August 3, 2011

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Introduction

Q. Please state your name, occupation and business address.

A. My name is Pauline M. Ahern. I am a Principal of AUS Consultants. My business address is 155 Gaither Drive, Suite A, Mt. Laurel, New Jersey 08054.

Q. Please summarize your professional experience and educational background.

A. I have offered expert testimony on behalf of investor-owned utilities before twenty-six state regulatory commissions on rate of return issues, including but not limited to common equity cost rate, fair rate of return, capital structure issues, credit quality issues and the like. I am a graduate of Clark University, Worcester, MA, where I received a Bachelor of Arts degree with honors in Economics in 1973. In 1991, I received a Master of Business Administration with high honors and a concentration in finance from Rutgers University. The details of these appearances, my educational background, presentations I have given and articles I have co-authored are shown in Appendix A supplementing this testimony.

On a monthly basis, I also calculate and maintain the American Gas Association (A.G.A.) Gas Index under contract with the A.G.A., which serves as the benchmark against which the performance of the American Gas Index Fund (AGIF) is measured. The A.G.A. Gas Index and AGIF are a market capitalization weighted index and fund, respectively, comprised of the common stocks of the publicly traded corporate members of the A.G.A.

I am also the Publisher of AUS Utility Reports, responsible for supervising the production, publication, distribution and marketing of its various reports.

I am a member of the Society of Utility and Regulatory Financial Analysts

(SURFA) where I serve on its Board of Directors, having served two terms as President, from 2006 – 2008 and 2008 – 2010. Previously, I held the position of Secretary/Treasurer from 2004 – 2006. In 1992, I was awarded the professional designation "Certified Rate of Return Analyst" (CRRA) by SURFA, which is based upon education, experience and the successful completion of a comprehensive written examination.

I am also an associate member of the National Association of Water Companies, serving on its Finance/Accounting/Taxation Committee; a member of the Energy Association of Pennsylvania, formerly the Pennsylvania Gas Association; and a member of the American Finance and Financial Management Associations.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my Direct Testimony is to provide testimony on behalf of Carolina Water Service, Inc. (CWS) relative to the overall rate of return including common equity cost rate which it should be afforded the opportunity to earn on its jurisdictional rate base.

Q. Have you prepared schedules which support your recommended common equity cost rate?

A. Yes. They have been marked for identification as Schedules PMA-1 through PMA-14.

Summary

Q. What is your range of recommended common equity cost rate?

A. I recommend that the Public Service Commission of South Carolina (PSC SC or the Commission) authorize the Company the opportunity to earn a common equity cost rate in the range of 10.80% to 11.40%. A common equity cost rate range of 10.80% to 11.40% results in an overall rate of return of 8.70% to 9.00%, respectively based upon the consolidated capital structure at December 31, 2010 of Utilities, Inc. (UI or the Parent)

which consisted of 50.11% long-term debt at a cost rate of 6.60% an 49.89% common equity. The overall rate of return is summarized in Table 1 below:

Table 1

Type of Capital	Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	50.11%	6.60%	3.31%
Common Equity	49.89	10.80 – 11.40	5.39 – 5.69
Total	100.00%		8.70% - 9.00%

Q. Please summarize your recommended range of common equity cost rate.

A. My recommended range of common equity cost rate of 10.80% to 11.40% is summarized on Schedule PMA-1, page 2. As a wholly-owned subsidiary of UI, CWS's common stock is not publicly traded. Thus, a market-based common equity cost rate cannot be determined directly for the Company. Consequently, in arriving at my recommended range of common equity cost rate of 10.80% - 11.40%, I have assessed the market-based common equity cost rates of companies of relatively similar, but not necessarily identical risk, i.e., proxy group(s) for insight into a recommended common equity cost rate applicable to CWS and suitable for cost of capital purposes. Using companies of relatively comparable similar risk as proxies is consistent with the principles of fair rate of return established in the *Hope*[1] and *Bluefield*[2] cases, adding reliability to the informed expert judgment necessary to arrive at a recommended common equity cost rate. However, no proxy group(s) can be selected to be identical in risk to CWS. Therefore, the proxy group(s)' results must be adjusted, if necessary, to reflect the unique relative

[1] Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591 (1944).

[2] Bluefield Water Works Improvement Co. v. Public Serv. Comm'n, 262 U.S. 679 (1922).

financial and/or business risk of the Company, as will be discussed in detail subsequently.

Consistent with the Efficient Market Hypothesis (EMH), which will be discussed in more detail below, my recommendation results from the application of market-based cost of common equity models, the Discounted Cash Flow (DCF) approach, the Risk Premium Model (RPM) and the Capital Asset Pricing Model (CAPM) for the proxy group of nine water companies whose selection will be discussed subsequently. In addition, I also selected a group of domestic, non-price regulated companies comparable in total risk to the nine water companies, applying the DCF, RPM and CAPM to them as well as assessing projected returns on book common equity or partner's capital in accordance with the opportunity cost standards encapsulated in *Hope* and *Bluefield*.

The results derived from each are as follows:

Table 2

	Proxy Group of Nine Water Companies
Discounted Cash Flow Model	9.54%
Risk Premium Model	10.33
Capital Asset Pricing Model	10.42
Cost of Equity Models Applied to Comparable Risk, Non-Price Regulated Companies	13.45
Indicated Common Equity Cost Rate Before Adjustment for Financial Risk, Flotation Costs and Business Risks	10.40 – 11.00
Financial Risk Adjustment	(0.08) (0.08)
Business Risk Adjustment	0.50 0.50
Indicated Common Equity Cost Rate	10.82% 11.42%
Recommended Common Equity Cost Rate	10.80% 11.40%

After reviewing the cost rates based upon these models, I conclude that a common equity cost rate range of 10.40% to 11.00% is indicated before any adjustment for financial and business risks related to CWS's lower financial risk and its smaller size relative to the proxy group of nine water companies. The indicated common equity cost rate based upon the nine water companies was adjusted downward by 8 basis points (a negative 0.08%) to reflect CWS's slightly lower financial risk relative to the nine water companies, and upward by 50 basis points (0.50%) to reflect CWS's increased business risk as noted above. These adjustments will be discussed subsequently. After adjustment, the financial and business risk-adjusted range of common equity cost rate is 10.82% to

11.42% which I have rounded to 10.80% to 11.40%, my recommended range of common equity cost rate.

General Principles

Q. What general principles have you considered in arriving at your recommended range of common equity cost rate of 10.80% to 11.40%?

A. In unregulated industries, the competition of the marketplace is the principal determinant of the price of products or services. For regulated public utilities, regulation must act as a substitute for marketplace competition. Assuring that the utility can fulfill its obligations to the public while providing safe and adequate service at all times requires a level of earnings sufficient to maintain the integrity of presently invested capital as well as permitting the attraction of needed new capital at a reasonable cost in competition with other firms of comparable risk, consistent with the fair rate of return standards established by the U.S. Supreme Court in the previously cited *Hope* and *Bluefield* cases. Consequently, marketplace data must be relied upon in assessing a common equity cost rate appropriate for ratemaking purposes. Therefore, my recommended common equity cost rate is based upon marketplace data for a proxy group of utilities as similar in risk as possible to CWS, based upon selection criteria which will be discussed subsequently. Just as the use of the market data for the proxy group(s) adds reliability to the informed expert judgment used in arriving at a recommended common equity cost rate, the ability to use multiple common equity cost rate models also adds reliability when arriving at a company-specific common equity cost rate.

Business Risk

Q. Please define business risk and explain why it is important to the determination of a fair rate of return.

A. Business risk is the riskiness of a company's common stock without the use of debt and/or preferred capital. Examples of such general business risk to all utilities, i.e., water, electric and natural gas distribution, include the quality of management, the regulatory environment, customer mix and concentration of customers, service territory growth, capital intensity, size, and the like, which have a direct bearing on earnings.

Business risk is important to the determination of a fair rate of return because the greater the level of risk, the greater the rate of return investors demand, consistent with the basic financial precept of risk and return.

Q. Please discuss the business risks facing the water industry in general.

A. Water is essential to life and unlike electricity or natural gas, water is the only utility product which is ingested. Consequently, water quality is of paramount importance to the health and well-being of customers and subject to additional health and safety regulations. In addition, unlike many electric and natural gas utilities, water companies serve a production function in addition to the delivery functions served by electric and gas utilities.

Water utilities obtain supply from wells, aquifers, surface water reservoirs, streams and rivers, or through water rights. Throughout the years, well supplies and aquifers have been environmentally threatened, with historically minor purification treatment having given way to major well rehabilitation, treatment or replacement. Simultaneously, environmental water quality standards have tightened considerably,

requiring multiple treatments. In addition, drought, water source overuse, runoff, threatened species/habitat protection and other factors are limiting supply availability. As for water rights, their lives are typically finite with renewability uncertain. In the course of procuring water supplies and treating water so that it meets Safe Drinking Water Act standards, water utilities have an ever-increasing responsibility to be stewards of the environment from which supplies are drawn, in order to preserve and protect the natural resources of the United States.

Moreover, electric and natural gas companies, where transmission and distribution is separate from generation, generally do not produce the electricity or natural gas which they transmit and distribute. In contrast, water utilities are typically vertically engaged in the entire process of acquiring supply, production (treatment) and distribution of water. Hence, water utilities require significant capital investment in sources of supply and production (wells and treatment facilities), in addition to transmission and distribution systems, both to serve additional customers and to replace aging systems, creating a major risk facing the water and wastewater utility industry.

Value Line Investment Survey[3] (Value Line) observes the following about the water utility industry:

> Water utility stocks have been met with some resistance since our January review. Indeed, all but a single issue covered in our *Survey* gave back some ground. And the exception advanced less than 10% in price. As a result, the group, as a whole, has slipped into the bottom half of the pack for Timeliness after residing in the top quartile last time around.
>
> Wall Street's apprehension is not surprising, given that most of the

[3] Value Line Investment Survey, April 22, 2011.

companies reported disappointing earnings in the fourth-quarter. (First-quarter results were not released as of the day of this report). Indeed, revenue growth, although healthy thanks to continued progress on the regulatory front, seemed to fall short of expectations. Earnings, meanwhile, were further frustrated by the increasing costs of doing business.

The group's growth prospects going forward are not overly impressive either. With the exception of *American Water Works*, not a single stock in this industry stands out for Timeliness or 3- to 5-year price appreciation potential. The companies here face stiff headwinds on the cost front, as many of the country's water systems are aging and increasing in the need for repairs and maintenance. Financial constraints are of further concern, with the financial moves that are likely to be made in order to maintain infrastructures dilutive to share-net growth.

* * *

Despite a more favorable regulatory climate, providers still have troubles facing them. Infrastructures are decaying rapidly and, in many cases, need complete overhauls. The costs to make the repairs are exorbitant many operating in this space do not have the funds on hand to foot the bill. Indeed, most are strapped for cash and will have to look to outside financiers to keep up. Although consolidation trends present unique opportunities for those with the financial capabilities to throw their hat in the ring, such as *Aqua America*, others are just trying to stay afloat. Unfortunately, the financing costs to stay in business, whether it be additional share or debt offerings, will probably drown most and dilute shareholder gains moving ahead.

* * *

The bulk of the stocks in this group have lost any luster they had from a growth perspective. Although the share-price weakness makes for more attractive entry points, only *American States Water* stands out for appreciation potential. That said, the dividends of many help make for worthwhile total return appeal in some cases. Again *American States Water*, along with the *American Water Works*, and newcomer *SJW Corp.*, top the list on this account. ....That said, we do think that there are better options out there for investors looking to add an income producing stock to the portfolios.

In addition, because the water and wastewater industry is much more capital-intensive than the electric, natural gas or telephone industries, the investment required to produce a

dollar of revenue is greater. For example, as shown on page 1 of Schedule PMA-2, it took $3.82 of net utility plant on average to produce $1.00 in operating revenues in 2010 for the water utility industry as a whole. For CWS specifically, it took $6.08 of net utility plant to produce $1.00 in operating revenues in 2010. In contrast, for the electric, combination electric and gas and natural gas utility industries, on average it took only $2.16, $1.70 and $1.27, respectively, to produce $1.00 in operating revenues in 2010. The greater capital intensity of water utilities is not a new phenomenon as water utilities have exhibited a consistently and significantly greater capital intensity relative to electric, combination electric and gas and natural gas utilities during the ten years ended 2010, as shown on page 2 of Schedule PMA-2. As financing needs have increased over the last decade, the competition for capital from traditional sources has increased, making the need to maintain financial integrity and the ability to attract needed new capital increasingly important. Because investor-owned water utilities typically do not receive federal funds for infrastructure replacement, the challenge to investor-owned water utilities is exacerbated and their access to financing is restricted, thus increasing risk.

The National Association of Regulatory Commissioners (NARUC) has also highlighted the challenges facing the water and wastewater industry stemming from its capital intensity. NARUC's Board of Directors adopted the following resolution in July 2006:[4]

> WHEREAS, To meet the challenges of the water and wastewater industry which may face a combined capital investment requirement nearing one trillion dollars over a 20-year period, the following policies and mechanisms were identified to help ensure sustainable practices in promoting needed capital investment and cost-effective rates: a)

[4] "Resolution Supporting Consideration of Regulatory Policies Deemed as 'Best Practices'", Sponsored by the Committee on Water. Adopted by the NARUC Board of Directors, July 27, 2006.

the use of prospectively relevant test years; b) the distribution system improvement charge; c) construction work in progress; d) pass-through adjustments; e) staff-assisted rate cases; f) consolidation to achieve economies of scale; g) acquisition adjustment policies to promote consolidation and elimination of non-viable systems; h) a streamlined rate case process; i) mediation and settlement procedures; j) defined timeframes for rate cases; k) integrated water resource management; l) a fair return on capital investment; *and* m) improved communications with ratepayers and stakeholders; *and*

WHEREAS, Due to the massive capital investment required to meet current and future water quality and infrastructure requirements, adequately adjusting allowed equity returns to recognize industry risk in order to provide a fair return on invested capital was recognized as crucial…

RESOLVED, That the National Association of Regulatory Utility Commissions (NARUC), convened in its July 2006 Summer Meetings in Austin, Texas, conceptually supports review and consideration of the innovative regulatory policies and practices identified herein as "best practices;" *and be it further*

RESOLVED, That NARUC recommends that economic regulators consider and adopt as many as appropriate of the regulatory mechanisms identified herein as best practices…

The water utility industry also experiences lower relative depreciation rates. Lower depreciation rates, as one of the principal sources of internal cash flows for all utilities, mean that water utility depreciation as a source of internally-generated cash is far less than for electric, natural gas or telephone utilities. Water utilities' assets have longer lives and, hence, longer capital recovery periods. As such, water utilities face greater risk due to inflation which results in a higher replacement cost per dollar of net plant than for other types of utilities. As shown on page 3 of Schedule PMA-2, water utilities experienced an average depreciation rate of 3.0% for 2010 with CWS experiencing a lower rate of 2.4%. In contrast, in 2010, the electric, combination electric and gas, and natural gas, experienced average depreciation rates of 3.7%, 3.7% and 3.4%, respectively.

As with capital intensity, the lower relative depreciation rates of water and wastewater utilities is not a new phenomenon. As shown on page 4 of Schedule PMA-2,

water utility depreciation rates have been consistently and much lower than those of the electric, combination electric and gas and natural gas utilities. Such low depreciation rates signify that the pressure on cash flows remains significantly greater for water utilities than for other types of utilities.

In addition, not only is the water utility industry historically capital intensive, it is expected to incur significant capital expenditure needs over the next 20 years. Prior to the recent economic and capital market turmoil, Standard & Poor's (S&P) noted[5]:

> Standard & Poor's expects the already capital-intensive water utility industry to become even more so over the next several years. Due to the aging pipeline infrastructure and more stringent quality standards, the U.S. Environmental Protection Agency's (EPA) foresees a need for $277 billion to upgrade and maintain U.S. water utilities through 2022, with about $185 billion going toward infrastructure improvements. In addition, about $200 billion will be needed for wastewater applications, which suggests increased capital spending to be a long-term trend in this industry.
>
> In line with these trends, many companies have announced aggressive capital spending programs. Forecast capital spending primarily focuses on infrastructure replacements and growth initiatives. Over the past five years, capital spending has been equivalent to about three times its depreciation expense. However, companies are now forecasting spending to be at or above four times depreciation expense over the intermediate term. For companies in regulatory jurisdictions that provide timely cost recovery for capital expenditures, the increased spending is likely to have a minimal effect on financial metrics and ratings. However, companies in areas without these mechanisms, earnings, and cash flow could be negatively affected by the increased spending levels, which over the longer term could harm a company's overall credit profile.
>
> Due to the high level of capital spending, U.S. investor-owned water utilities do not generate positive free cash flow. This, coupled with the forecast increase in capital spending over the intermediate term, will require additional access to capital markets. We expect rated water companies to have enough financial flexibility to gain that access. Ratings

[5] Standard & Poor's, Credit Outlook For U.S. Investor-Owned Water Utilities Should Remain Stable in 2008 (January 31, 2008) 2, 4.

actions shouldn't result from this increased market activity because we expect companies to use a balanced financing approach, which should maintain debt near existing levels.

Specifically, the EPA states the following[6]:

> The survey found that the total nationwide infrastructure need is $334.8 billion for the 20-year period from January 2007 through December 2026. With $200.8 billion in needs over the next 20 years, transmission and distribution projects represent the largest category of need. This result is consistent with the fact that transmission and distribution mains account for most of the nation's water infrastructure. The other categories, in descending order of need are: treatment, storage, source and a miscellaneous category of needs called "other". The large magnitude of the national need reflects the challenges confronting water systems as they deal with an infrastructure network that has aged considerably since these systems were constructed, in many cases, 50 to 100 years ago.

In its 2009 infrastructure Fact Sheet[7] published by the American Society of Civil Engineers (ASCE) they state:

> America's drinking water systems face an annual shortfall of at least $11 billion to replace aging facilities that are near the end of their useful lives and to comply with existing and future federal water regulations. This does not account for growth in the demand for drinking water over the next 20 years. Leaking pipes lose an estimated 7 billion gallons of clean drinking water a day.

Water utility capital expenditures as large as projected by the EPA and ASCE will require significant financing. The three sources typically used for financing are debt, equity (common and preferred) and cash flow. All three are intricately linked to the opportunity to earn a sufficient rate of return as well as the ability to achieve that return. Consistent with the *Bluefield* and *Hope* decisions discussed previously, the return must be

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6 "Fact Sheet: "EPA's 2007 Drinking Water Infrastructure Needs Survey and Assessment", United States Environmental Protection Agency, Office of Water, February 2009, 1.

7 2009 American Society of Civil Engineers, Report Card for America's Infrastructure 2009.

sufficient enough to maintain credit quality as well as enable the attraction of necessary new capital, be it debt or equity capital. If unable to raise debt or equity capital, the utility must turn to either retained earnings or free cash flow, both of which are directly linked to earning a sufficient rate of return. If either is inadequate, it will be nearly impossible for the utility to invest in needed infrastructure. Since all utilities typically experience negative free cash flows, it is clear that an insufficient rate of return can be financially devastating for utilities and for its customers, the ratepayers. Page 5 of Schedule PMA-2 demonstrates that the free cash flows (funds from operations minus capital expenditures) of water utilities as a percent of total operating revenues has been consistently more negative than that of the electric, combination electric and gas and natural gas utilities for the ten years ended 2010. Magnifying the impact of water utilities' negative free cash flow position is a continued inability to achieve what may already be an insufficient authorized rate of return on common equity, as will be discussed subsequently.

Consequently, as with the previously discussed capital intensity and depreciation rates, significant capital expenditures relative to net plant as well as the consistently and more significantly negative free cash flow relative to operating revenues of water utilities indicates greater investment risk for water utilities relative to electric, combination electric and gas and natural gas utilities.

In view of the foregoing, it is clear that the water utility industry's high degree of capital intensity, low depreciation rates and significant negative free cash flow, coupled with the need for substantial infrastructure capital spending, requires regulatory support in the form of adequate and timely rate relief, as recognized by NARUC, so water utilities will be able to successfully meet the challenges they face.

Q. Are there other indications that the water utility industry exhibits more investment risk than the electric, combination electric and gas and natural gas utility industries?

A. Yes. Schedule PMA-3 presents several such indications: total debt / earnings before interest, taxes, depreciation and amortization (EBITDA); funds from operations (FFO) / total debt; funds from operations / interest coverage; before-income tax / interest coverage; earned returns on common equity (ROEs) and earned v. authorized ROEs for each utility industry for the ten years ended 2010. The increasing proportion of total debt to EBITDA for the water utilities indicates significantly increasing and greater financial risk for water utilities, which began the most recent ten years below that of electric, combination electric and gas and natural gas utilities.

As noted previously, S&P evaluates total debt as a percentage of EBITDA and FFO as a percentage of debt in the bond / credit rating process. Page 1 of Schedule PMA-3 shows that total debt / EBITDA has risen steadily for water utilities for the ten years ended 2010, dropping only slightly for 2010. Notwithstanding the decline in 2010, total debt / EBITDA is now higher than that for electric, combination electric and gas and natural gas utilities. Page 2 shows that FFO / total debt has steadily declined for water utilities over the decade ending 2010, while rising for the other utility groups. The consistently low level of FFO / total debt for the water utilities, is a further indication of the pressures upon water utility cash flows and the increased relative investment risk which the water utility industry faces.

Pages 3 and 4 of Schedule PMA-3 confirm the pressures upon both cash flows and income faced by water utilities. Page 3 shows that FFO / interest coverage for water,

electric, combination electric and gas and natural gas utilities followed a similar pattern to FFO interest coverage for the ten years ended 2010. FFO interest coverage remained relative consistent for water utilities, rising and falling between 2.0 and 3.0 times during the period. A similar pattern was exhibited by electric utilities. However, FFO / total debt for combination electric and gas as well as natural gas utilities rose during the ten years, exceeding that of water utilities significantly in 2009 and dropping back somewhat in 2010. Page 4 shows that before-income tax coverage interest coverage for water utilities also remained relatively stable, falling below that of gas utilities in 2002 and below that of electric and combination electric and gas utilities between 2005 and 2006, where it remained for the remainder of the ten years. In 2010, in all likelihood due to the "Great Recession" and the economy's currently nascent, fragile recovery from it, before-income tax interest coverage for water, electric and combination electric and gas utilities has converged at slightly lower than 3.0 times, while natural gas utilities continue to enjoy a significantly greater before-income tax interest coverage of approximately 4.25 times in 2010. Once again, the consistency and relatively low level of interest coverage ratios for water utilities are further indications of the pressures upon cash flow which water utilities face, confirming greater investment risk for water utilities relative to electric, combination electric and gas and natural gas utilities.

A final indication of the relative investment risk of water utilities compared with electric, combination electric and gas and natural gas utilities, are trends in earned and authorized ROEs. As shown on page 5 of Schedule PMA-3, earned ROEs, on average, for water utilities have generally been below those of electric, combination electric and gas and natural gas utilities during the ten years ended 2010. They have consistently been

lower for the last five years. However, such a comparison would not be complete without a comparison of earned ROEs with authorized ROEs, as shown on pages 6 and 7 of Schedule PMA-3. The authorized ROEs are those reported in AUS Utility Reports for the last month of each year representing the authorized ROEs in effect during the previous year, rather than the outcomes of rate cases decided during the year. Hence, these authorized ROEs represent the revenue requirements of each year which give rise to the earned ROEs in each year. Water utilities generally, consistently and dramatically earned far below their authorized ROEs, while electric and combination electric and gas utilities earned above their authorized ROEs in some years and below in others. In contrast, natural gas utilities generally, consistently and dramatically earned above their authorized ROEs. Notwithstanding the closing of the gap between the average authorized ROEs for the various utility groups over the ten year period, for the majority of the period, water utilities have failed to earn their average authorized ROE with earned ROEs significantly lower than authorized, a likely contributing factor to the greater risk indicated by the previously discussed coverage metrics.

In view of all of the foregoing, it is clear that the investment risk of water utilities has increased over the most recent ten years and that water utilities currently face greater investment risk relative to electric, combination electric and gas and natural gas utilities.

Q. Does CWS face additional extraordinary business risk?

A. Yes. CWS faces additional extraordinary business risk due to its smaller size relative to the proxy group. As discussed above, the greater the level of risk, the greater the rate of return demanded / required by investors, consistent with the basic financial precept of risk and return. Therefore an upward adjustment to the indicated common equity cost rate is

necessary to reflect the smaller size of CWS.

Q. Please explain how CWS's smaller size increases its business risk relative to the proxy groups.

A. As will be discussed subsequently, CWS's smaller size, $18.980 million in estimated market capitalization relative to the average market capitalization of $1.195 billion for the nine water companies, shown on page 1 of Schedule PMA-14, indicates greater relative business risk because all else equal, size has a bearing on risk. It is clear, too, that on a relative basis, water utilities on average are smaller in terms of market capitalization than electric, combination electric and gas and natural gas utilities, as demonstrated on page 5 of Schedule PMA-3, which shows the market capitalization of each utility for the ten years ended 2010.

Q. Please explain why size has a bearing on business risk.

A. It is conventional wisdom, supported by actual returns over time, that smaller companies tend to be more risky causing investors to expect greater returns as compensation for that risk. Smaller companies are simply less able to cope with significant events which affect sales, revenues and earnings. For example, in general, the loss of revenues from a few larger customers would have a greater effect on a small company than on a much larger company with a larger, more diverse, customer base. Moreover, smaller companies are generally less diverse in their operations as well as experiencing less financial flexibility. In addition, the effect of extreme weather conditions, i.e., prolonged droughts or extremely wet weather, will have a greater affect upon a small operating water utility than upon the much larger, more geographically diverse holding companies.

Further evidence of the risk effects of size include the fact that investors demand

greater returns to compensate for the lack of marketability and liquidity of the securities of smaller firms. That it is the use of funds invested and not the source of those funds which gives rise to the risk of any investment is a basic financial principle[8]. Therefore, because CWS is the regulated utility to whose jurisdictional rate base the overall cost of capital allowed by the Commission will be applied, the relevant risk reflected in the cost of capital must be that of CWS, including the impact of its small size on common equity cost rate. As noted previously, CWS is smaller than the average proxy group company based upon the results of a study of the market capitalization of the nine water companies as shown on Schedule PMA-14.

In addition, Brigham[9] states:

> A number of researchers have observed that portfolios of small-firms have earned consistently higher average returns than those of large-firms stocks; this is called "small-firm effect." On the surface, it would seem to be advantageous to the small firms to provide average returns in a stock market that are higher than those of larger firms. In reality, it is bad news for the small firm; what *the small-firm effect means is that the capital market demands higher returns on stocks of small firms than on otherwise similar stocks of the large firms.* (italics added)

Financial Risk

Q. Please define financial risk and explain why it is important to the determination of a fair rate of return.

A. Financial risk is the additional risk created by the introduction of senior capital, i.e., debt and preferred stock, into the capital structure. The higher the proportion of senior capital in the capital structure, the higher the financial risk which must be factored into the

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[8] Brealey, Richard A. and Myers, Stewart C., Principles of Corporate Finance (McGraw-Hill Book Company, 1988) 173 198.

[9] Brigham, Eugene F., Fundamentals of Financial Management, Fifth Edition (The Dryden Press, 1989) 623.

common equity cost rate, consistent with the previously mentioned basic financial principle of risk and return, i.e., investors demand a higher common equity return as compensation for bearing higher investment risk.

In May 2009, S&P expanded its Business Risk / Financial Risk Matrix in an effort to augment its independence, strengthen the rating process and increase S&P's transparency to better serve its markets (see page 4 of Schedule PMA-4). S&P initially published its electric, gas, and water utility ratings rankings in a framework consistent with the manner in which it presents its rating conclusions across all other corporate sectors in November 2007. S&P then stated[10]:

> Incorporating utility ratings into a shared framework to communicate the fundamental credit analysis of a company furthers the goals of transparency and comparability in the ratings process.
>
> * * *
>
> The utilities rating methodology remains unchanged, and the use of the corporate risk matrix has not resulted in any changes to ratings or outlooks. The same five factors that we analyzed to produce a business risk score in the familiar 10-point scale are used in determining whether a utility possesses an "Excellent," "Strong," "Satisfactory," "Weak," or "Vulnerable" business risk profile.

In May 2009, S&P revised its Business Risk / Financial Risk Matrix with the new business risk/financial risk matrix shown in Table 1 on page 2 of Schedule PMA-4 and financial risk indicative ratios for utilities shown in Table 2 on page 4. Notwithstanding the metrics published in Table 2, S&P stated:

> The rating matrix indicative outcomes are what we typically observe – but are not meant to be precise indications or guarantees of future rating opinions. Positive and negative nuances in our analysis may lead to a notch higher or lower than the outcomes indicated in the various cells of

[10] Standard & Poor's – Ratings Direct – "U.S. Utilities Ratings Analysis Now Portrayed In The S&P Corporate Ratings Matrix" (November, 30, 2007) 2.

the matrix.

As shown on Schedule PMA-8, page 2, the average S&P bond rating (issuer credit rating), business risk profile and financial risk profile of the nine water companies are split A+ (A), Excellent and Intermediate.

Q. Please describe CWS's degree of financial risk relative to the proxy group of nine water companies.

A. Although CWS's ratemaking capital structure ratios and hence, financial risk are similar to the nine water companies on average, CWS's ratemaking long-term debt ratio at December 31, 2011 of 50.11% is slightly lower than the average long-term debt ratio of the nine water companies, 50.97%, at December 31, 2010. Therefore, CWS's financial risk, although similar, is slightly lower than that of the nine water companies. Consistent with the previously mentioned financial principle of risk and return, the lower financial risk of CWS must be reflected in the recommended common equity cost rate. Consequently, a downward adjustment of 8 basis points (a negative 0.08%) was made to the indicated range of common equity cost rate of 10.40% to 11.00% based upon the nine water companies before adjustment for financial risk and business risk. The derivation of this adjustment will be discussed subsequently.

Q. Nevertheless, can the combined business risks, i.e., investment risk of an enterprise, be proxied by bond and credit ratings?

A. Yes, similar bond ratings/issuer credit (bond/credit) ratings reflect and are representative of similar combined business and financial risks, i.e., total risk faced by bond investors. Although specific business or financial risks may differ between companies, the same bond/credit rating indicates that the combined risks are similar, albeit not necessarily

equal, as the purpose of the bond/credit rating process is to assess credit quality or credit risk and not common equity risk. Risk distinctions within S&P's bond rating categories are recognized by a plus or minus, i.e., within the A category, an S&P rating can be at A+, A, or A-. Similarly, risk distinctions for Moody's ratings are distinguished by numerical rating gradations, i.e., within the A category, a Moody's rating can be A1, A2 and A3. For S&P, additional risk distinctions are reflected in the assignment of one of the six business risk profiles and six financial risk profiles, shown in Tables 1 and 2 on pages 2 and 4 of Schedule PMA-4.

In summary, it is clear that S&P's bond/credit rating process encompasses a qualitative analysis of business and financial risks (see page 3 of Schedule PMA-4). While not a means by which one can specifically quantify the differential in common equity risk between companies, bond/credit ratings provide a useful means with which to compare/differentiate investment risk between companies because they are the result of a thorough and comprehensive analysis of all diversifiable business risks, i.e., investment risk.

Carolina Water Service, Inc.

Q. Have you reviewed the rate filing of CWS?

A. Yes. CWS provides service to approximately 22,100 water and sewer customers in areas of Lexington, Sumter, Richland, Beaufort, Orangeburg, Georgetown, Williamsburg, Aiken and York counties in South Carolina. CWS is a wholly-owned subsidiary of UI. Consequently, the Company's common stock is not publicly traded.

Proxy Group

Q. Please explain how you chose the proxy group of nine water companies.

A. The basis of selection for the proxy group was to select those companies which meet the following criteria: 1) they are included in the Water Company Group of AUS Utility Reports (July 2011); 2) they have Value Line, Reuters, Zacks or Yahoo! Finance, consensus five-year earnings per share (EPS) growth rate projections; 3) they have a positive Value Line five-year dividends per share (DPS) growth rate projection: 4) they have a Value Line adjusted beta; 5) they have not cut or omitted their common dividends during the five years ending 2010 or through the time of the preparation of this testimony; 6) they have 60% or greater of 2010 total operating income derived from and 60% or greater of 2010 total assets devoted to regulated water operations; and 7) at the time of the preparation of this testimony, they had not publicly announced that they were involved in any major merger or acquisition activity.

The following companies met these criteria: American States Water Co., American Water Works Co., Inc., Aqua America, Inc., Artesian Resources Corp., California Water Service Corp., Connecticut Water Service, Inc., Middlesex Water Company, SJW Corporation and York Water Company.

Q. Please describe Schedule PMA-5.

A. Schedule PMA-5 contains comparative capitalization and financial statistics for the nine water companies for the years 2006-2010.

During the five-year period ending 2010, the historically achieved average earnings rate on book common equity for the group averaged 7.51%. The average common equity ratio based upon total permanent capital (excluding short-term debt) was

49.71%, and the average dividend payout ratio was 63.57%.

Total debt as a percent of EBITDA for the years 2006-2010 ranged between 4.56 and 9.07 times, averaging 5.90 times, while funds from operations relative to total debt ranged from 15.04% to 17.10%, averaging 16.25%.

Common Equity Cost Rate Models

The Efficient Market Hypothesis (EMH)

Q. Please describe the conceptual basis of the EMH.

A. The EMH, which is the foundation of modern investment theory, was pioneered by Eugene F. Fama[11] in 1970. An efficient market is one in which security prices reflect all relevant information all the time, with the implication that prices adjust instantaneously to new information, thus reflecting the intrinsic fundamental economic value of a security.[12]

The generally-accepted "semistrong" form of the EMH asserts that all publicly available information is fully reflected in securities prices, i.e., that fundamental analysis cannot enable an investor to "out-perform the market" in the long-run as noted by Brealey and Myers[13]. The "semistrong" form of the EMH is generally held to be true because the use of insider information often enables investors to earn excessive returns by "outperforming the market" in the short-run. This means that all perceived risks and publicly-available information are taken into account by investors in the prices they pay for securities, such as bond/credit ratings, discussions about companies by bond/credit

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11 Fama, Eugene F., "Efficient Capital Markets: A Review of Theory and Empirical Work" (Journal of Finance, May 1970) 383-417.

12 Morin, Roger A., New Regulatory Finance (Public Utility Reports, Inc., 2006) 279-281.

13 Brealey, Richard A. and Myers, Stewart C., Principles of Corporate Finance First Edition, (McGraw-Hill, 1996) 329.

rating agencies and investment analysts as well as the discussions of the various common equity cost rate methodologies (models) in the financial literature. In an attempt to emulate investor behavior, no single common equity cost rate model should be relied upon exclusively in determining a cost rate of common equity and the results of multiple costs of common equity models should be taken into account. In addition, the academic literature provides substantial support for the need to rely upon more than one cost of common equity model in arriving at a recommended common equity cost rate.[14]

Q. Are the cost of common equity models you use market-based models, and hence based upon the EMH?

A. Yes. The DCF model is market-based in that market prices are utilized in developing the dividend yield component of the model. The RPM is market-based in that the bond ratings and expected bond yields used in the application of the RPM reflect the market's assessment of bond/credit risk. In addition, the use of betas to determine the equity risk premium also reflects the market's assessment of market/systematic risk as betas are derived from regression analyses of market prices. The CAPM is market-based for many of the same reasons that the RPM is market-based i.e., the use of expected bond (Treasury bond) yields and betas. The process of selecting the comparable risk non-utility companies is market-based in that it is based upon statistics which result from regression analyses of market prices and reflect the market's assessment of total risk. Therefore, all the cost of common equity models I utilize are market-based models, and hence based

[14] Morin 428-431.
Brigham, Eugene F. and Gapenski, Louis C., Financial Management – Theory and Practice Fourth Edition, (The Dryden Press, 1985) 256.
Brigham, Eugene F. and Daves, Phillip R., Intermediate Financial Management, (Thomson-Southwestern, 2007) 332-333.

upon the EMH.

Discounted Cash Flow Model (DCF)

Q. What is the theoretical basis of the DCF model?

A. The theory underlying the DCF model is that the present value of an expected future stream of net cash flows during the investment holding period can be determined by discounting those cash flows at the cost of capital, or the investors' capitalization rate. DCF theory indicates that an investor buys a stock for an expected total return rate which is derived from cash flows received in the form of dividends plus appreciation in market price (the expected growth rate). Mathematically, the dividend yield on market price plus a growth rate equals the capitalization rate, i.e., the total common equity return rate expected by investors.

Q. Which version of the DCF model do you use?

A. I utilize the single-stage constant growth DCF model because, in my experience, it is the most widely utilized version of the DCF used in public utility rate regulation. In my opinion, it is widely utilized because utilities are generally in the mature stage of their lifecycles and not transitioning from one growth stage to another. This is especially true for water utilities.

All companies, including utilities, go through typical life cycles in their development, initially progressing through a growth stage, moving onto a transition stage and finally assuming a steady-state or constant growth state. However, the U.S. public utility industry is a long-standing industry, dating back to approximately 1882. The standards of rate of return regulation of public utilities date back to the previously discussed principles of fair rate of return established in the *Hope* and *Bluefield* decisions

of 1944 and 1923, respectively. Hence, the public utility industry in the U.S. is a stable and mature industry characterized by the steady-state or constant-growth stage of a multi-stage DCF model. The regulated economics of the utility industry further reflect the features of this relative stability and demand maturity. Their returns on capital investment, i.e., rate base, are set through a ratemaking process and not determined in the competitive markets. This characteristic, taken together with the longevity of the public utility industry at large, all contribute to the stability and maturity of the industry, including the water utility industry.

Since there is no basis for applying multi-stage growth versions of the DCF model to determine the common equity cost rates of mature public utility companies, the constant growth model is most appropriate.

Q. Please describe the dividend yield you used in your application of the DCF model.

A. The unadjusted dividend yields are based upon a recent (July 6, 2011) indicated dividend divided by the average of closing market prices for the 60 days ending July 6, 2011 as shown in Column 1 on page 1 of Schedule PMA-6.

Q. Please explain the adjusted dividend yield shown on page 1 of Schedule PMA-6, Column 7.

A. Because dividends are paid quarterly, or periodically, as opposed to continuously (daily), an adjustment must be made to the dividend yield. This is often referred to as the discrete, or the Gordon Periodic, version of the DCF model.

DCF theory calls for the use of the full growth rate, or D_1, in calculating the dividend yield component of the model. However, since the various companies in the proxy group increase their quarterly dividend at various times during the year, a

reasonable assumption is to reflect one-half the annual dividend growth rate in the dividend yield component, or $D_{1/2}$. This is a conservative approach which does not overstate the dividend yield which should be representative of the next twelve-month period. Therefore, the actual average dividend yields in Column 1 on page 1 of Schedule PMA-6 have been adjusted upward to reflect one-half the average projected growth rate shown in Column 6.

Q. Please explain the basis of the growth rates of the proxy group which you use in your application of the DCF model.

A. Schedule PMA-7 shows that approximately 54% of the common shares of the nine water companies are held by individuals as opposed to institutional investors. Institutional investors tend to have more extensive informational resources than most individual investors. Individual investors, with more limited resources, are therefore likely to place great significance on the opinions expressed by financial information services, such as Value Line, Reuters, Zacks and Yahoo! Finance, which are easily accessible and/or available on the Internet and through public libraries. Investors realize that analysts have significant insight into the dynamics of the industries and individual companies they analyze, as well as company's abilities to effectively manage the effects of changing laws and regulations and ever changing economic and market conditions.

Over the long run, there can be no growth in DPS without growth in EPS. Security analysts' earnings expectations have a more significant, but not sole, influence on market prices than dividend expectations. Thus, the use of earnings growth rates in a DCF analysis provides a better matching between investors' market price appreciation expectations and the growth rate component of the DCF. Earnings expectations have a

significant influence on market prices and their appreciation or "growth" experienced by investors.[15] This should be evident even to relatively unsophisticated investors just by listening to financial new reports on radio, TV or reading the newspapers.

In addition, Myron Gordon, the "father" of the standard regulatory version of the DCF model widely utilized throughout the United States in rate base/rate of return regulation has recognized the significance of analysts' forecasts of growth in EPS in a speech he gave in March 1990 before the Institute for Quantitative Research and Finance. He said:

> We have seen that earnings and growth estimates by security analysts were found by Malkiel and Cragg to be superior to data obtained from financial statements for the explanation of variation in price among common stocks. . . estimates by security analysts available from sources such as IBES are far superior to the data available to Malkiel and Cragg. Eq (7) is not as elegant as Eq (4), but it has a good deal more intuitive appeal. It says that investors buy earnings, but what they will pay for a dollar of earnings increases with the extent to which the earnings are reflected in the dividend or in appreciation through growth.

Professor Gordon recognized that total return is largely affected by the terminal price which is mostly affected by earnings (hence price / earnings multiples). However, while EPS is the most significant factor influencing market prices, it is by no means the only factor that affects market prices, as recognized by Bonbright[16]:

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[15] Morin 298 - 303.

[16] Bonbright, James C., Danielsen, Albert L., Kamerschen, David R., Principles of Public Utility Rates (Public Utilities Reports, Inc., 1988) 334.

> In the first place, commissions cannot forecast, except within wide limits, the effect their rate orders will have on the market prices of the stocks of the companies they regulate. In the second place, *whatever the initial market prices may be, they are sure to change not only with the changing prospects for earnings, but with the changing outlook of an inherently volatile stock* market. In short, market prices are beyond the control, though not beyond the influence of rate regulation. Moreover, even if a commission did possess the power of control, any attempt to exercise it ... would result in harmful, uneconomic shifts in public utility rate levels. (italics added)

Studies performed by Cragg and Malkiel[17] demonstrate that analysts' forecasts are superior to historical growth rate extrapolations. Some question the accuracy of analysts' forecast of EPS growth, however, it does not really matter what the level of accuracy of those analysts' forecasts is well after the fact. What is important is that they reflect widely held expectations influencing investors at the time they make their pricing decisions and hence the market prices they pay. Moreover, there is no empirical evidence that investors, consistent with the EMH, would disregard analysts' estimates of growth in earnings per share.[18] As stated previously, the "semistrong" form of the EMH, which is generally held to be true, indicates investors are aware of all publicly-available information, including the many security analysts' earnings growth rate forecasts available. Investors are also aware of the accuracy of past forecasts, whether for EPS or DPS growth or for interest rates levels. Investors have no prior knowledge of the accuracy of any forecasts available at the time they make their investment decisions, as that accuracy only becomes known after some future period of time has elapsed.

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17 Cragg, John G. and Malkiel, Burton G., Expectations and the Structure of Share Prices (University of Chicago Press, 1982) Chapter 4.

18 Agrawal, Anup and Chen, Mark A., "Do Analysts' Conflicts Matter? Evidence from Stock Recommendations", (Journal of Law and Economics, August 2008), Vol. 51.

Therefore, given the overwhelming academic/empirical support regarding the superiority of security analysts' EPS growth rate forecasts, such EPS growth rate projections should be relied upon in a cost of common equity analysis.

In response to recent concern about the use of security analysts' EPS growth rate forecasts, Malkiel[19] affirmed his belief in the superiority of analysts' earnings forecasts when he testified before the Public Service Commission of South Carolina, in November 2002:

> With all the publicity given to tainted analysts' forecasts and investigations instituted by the New York Attorney General, the National Association of Securities Dealers, and the Securities & Exchange Commission, I believe the upward bias that existed in the late 1990s has indeed diminished. In summary, I believe that current analysts' forecasts are more reliable than they were during the late 1990s. Therefore, analysts' forecasts remain the proper tool to use in performing a Gordon Model DCF analysis.

Consequently, I have reviewed security analysts' projected growth rates in EPS, as well as Value Line's projected five-year compound growth rates in EPS for each company in the proxy group as shown in Columns 2 through 5, on page 1 of Schedule PMA-6.

Q. Please summarize the DCF model results.

A. As shown on page 1 of Schedule PMA-6, the median result of the application of the single-stage DCF model is 9.54% for the nine water companies. In arriving at a conclusion of a DCF-indicated common equity cost rate for the proxy group, I have relied upon the median of the results of the DCF, due to the wide range of DCF results as well

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19 Burton A. Malkiel, the Chemical Bank Chairman's Professor of Economics at Princeton University and author of the widely-read national bestselling book on investing entitled, "A Random Walk Down Wall Street: The Time-Tested Strategy for Successful Investing (Completely Revised and Updated)" (W.W. Norton & Co. 2011).

as the continuing volatile capital market conditions and to not give undue weight to outliers on either the high or the low side. In my opinion, the median is a more accurate and reliable measure of central tendency, and provides recognition of all the DCF results.

The Risk Premium Model (RPM)

Q. Please describe the theoretical basis of the RPM.

A. The RPM is based upon the basic financial principle of risk and return, namely, that investors require greater returns for bearing greater risk. The RPM recognizes that common equity capital has greater investment risk than debt capital, as common equity shareholders are last in line in any claim on a company's assets and earnings, with debt holders being first in line. Therefore, investors require higher returns from common stocks than from investment in bonds, to compensate them for bearing the additional risk.

While the investors' required common equity return cannot be directly determined or observed, it is possible to directly observe bond returns and yields. According to RPM theory, one can assess a common equity risk premium over bonds, either historically or prospectively, and then use that premium to derive a cost rate of common equity.

In summary, according to RPM theory, the cost of common equity equals the expected cost rate for long-term debt capital plus a risk premium over that cost rate to compensate common shareholders for the added risk of being unsecured and last-in-line for any claim on the corporation's assets and earnings.

Q. Some analysts state that the RPM is another form of the CAPM. Do you agree?

A. While there are some similarities, there is a very significant distinction between the two models. The RPM and CAPM both add a "risk premium" to an interest rate. However, the beta approach to the determination of an equity risk premium in the RPM should not

be confused with the CAPM. Beta is a measure of systematic, or market, risk, a relatively small percentage of total risk (the sum of both non-diversifiable systematic and diversifiable unsystematic risk). Unsystematic risk is fully captured in the RPM through the use of the long-term public utility bond yield as can be shown by reference to page 3 of Schedule PMA-4 which confirms that the bond/credit rating process involves a comprehensive assessment of both business and financial risks. In contrast, the use of a risk-free rate of return in the CAPM does not, and by definition cannot, reflect a company's specific, i.e., unsystematic, risk. Consequently, a much larger portion of the total common equity cost rate is reflected in the company- or proxy group-specific bond yield (a product of the bond rating) than is reflected in the risk-free rate in the CAPM, or even by the dividend yield employed in the DCF model. Moreover, the financial literature recognizes the RPM and CAPM as two separate and distinct cost of common equity models.

Q. Please explain the basis of the expected bond yield of 5.83% applicable to the proxy group of nine water companies shown on page 1 of Schedule PMA-8.

A. The first step in the RPM analysis is to determine the expected bond yield. Because both ratemaking and the cost of capital, including common equity cost rate, are prospective in nature, a prospective yield on similarly-rated long-term debt is essential. Since both ratemaking and the cost of capital are prospective in nature, I rely upon a consensus forecast of about 50 economists of the expected yield on Aaa rated corporate bonds for the six calendar quarters ending with the fourth calendar quarter of 2012 as derived from the July 1, 2011 Blue Chip Financial Forecasts (shown on page 7 of Schedule PMA-8). As shown on Line No. 1 of page 1 of Schedule PMA-8, the average expected yield on

Moody's Aaa rated corporate bonds is 5.35%. An adjustment of 34 basis points (0.34%) is necessary to adjust that average Aaa corporate bond yield to be equivalent to a Moody's A2 rated public utility bond as shown on Line No. 2 and explained in Note 2 resulting in an expected bond yield applicable to a Moody's A rated public utility bond of 5.69% as shown on Line No. 3.

Since the nine water companies average Moody's bond rating is A3, an adjustment of 14 basis points (0.14%) is necessary to make the prospective bond yield applicable to an A3 public utility bond, as detailed in Note 3 on page 1 of Schedule PMA-8. Therefore, the expected specific bond yield is 5.83% for the nine water companies as shown on Line No. 5.

Q. Please explain the method utilized to estimate the equity risk premium.

A. I evaluated the results of two different historical equity risk premium studies, as well as Value Line's forecasted total annual market return in excess of the prospective yield on Moody's Aaa corporate bonds, as detailed on pages 5, 6 and 8 of Schedule PMA-8. As shown on Line No. 3, page 5, the mean equity risk premium is 4.50% applicable to the nine water companies. This estimate is the result of an average of a beta-derived equity risk premium as well as the mean historical equity risk premium applicable to public utilities with bonds rated A based upon holding period returns. The basis of the beta-derived equity risk premium applicable to the proxy group is shown on page 6 of Schedule PMA-8. The beta-determined equity risk premium should receive substantial weight because betas are derived from the market prices of common stocks over a recent five-year period. Beta is a meaningful measure of prospective relative risk to the market as a whole and a logical means by which to allocate a company's/proxy group's share of

the market's total equity risk premium relative to corporate bond yields.

The total market equity risk premium utilized is 6.95% and is based upon an average of the long-term historical market risk premium and forecasted market risk premium. To derive the historical market equity risk premium, I used the most recent Morningstar[20] data on holding period returns for the S&P 500 Composite Index from the Ibbotson® SBBI® – 2011 Valuation Yearbook – Market Results for Stocks, Bonds, Bills and Inflation – 1926-2010 (SBBI – 2011) and the average historical yield on Moody's Aaa and Aa rated corporate bonds for the period 1926-2010. The use of holding period returns over a very long period of time is useful because it is consistent with the long-term investment horizon presumed by the DCF model. As the SBBI – 2011 states[21]:

> The estimate of the equity risk premium depends on the length of the data series studied. A proper estimate of the equity risk premium requires a data series long enough to give a reliable average without being unduly influenced by very good and very poor short-term returns. When calculated using a long data series, the historical equity risk premium is relatively stable.[5] Furthermore, because an average of the realized equity risk premium is quite volatile when calculated using a short history, using a long series makes it less likely that the analyst can justify any number he or she wants. The magnitude of how shorter periods can affect the result will be explored later in this chapter.
>
> Some analysts estimate the expected equity risk premium using a shorter, more recent time period on the basis that recent events are more likely to be repeated in the near future; furthermore, they believe that the 1920s, 1930s and 1940s contain too many unusual events. This view is suspect because all periods contain "unusual" events. Some of the most unusual events of the last hundred years took place quite recently, including the inflation of the late 1970s and early 1980s, the October 1987 stock market crash, the collapse of the high-yield bond market, the major contraction and consolidation of the thrift industry, the collapse of the Soviet Union,

[20] Morningstar, Inc. acquired Ibbotson Associates in 2006.

[21] Ibbotson® SBBI® – 2011 Valuation Yearbook – Market Results for Stocks, Bonds, Bills and Inflation – 1926 – 2010 (SBBI 2011) (Morningstar, Inc., 2010) 59.

> the development of the European Economic Community, and the attacks of September 11, 2001 and the more recent liquidity crisis of 2008 and 2009.
>
> It is even difficult for economists to predict the economic environment of the future. For example, if one were analyzing the stock market in 1987 before the crash, it would be statistically improbable to predict the impending short-term volatility without considering the stock market crash and market volatility of the 1929-1931 period.
>
> Without an appreciation of the 1920s and 1930s, no one would believe that such events could happen. The 85-year period starting with 1926 is representative of what can happen: it includes high and low returns, volatile and quiet markets, war and peace, inflation and deflation, and prosperity and depression. Restricting attention to a shorter historical period underestimates the amount of change that could occur in a long future period. Finally, because historical event-types (not specific events) tend to repeat themselves, long-run capital market return studies can reveal a great deal about the future. Investors probably expect "unusual" events to occur from time to time, and their return expectations reflect this. (footnote omitted)

Consequently, the long-term arithmetic mean total return rates on the market as a whole of 11.90% and the long-term arithmetic mean yield on corporate bonds of 6.10% were used, as shown at Line Nos. 1 and 2 of page 6 of Schedule PMA-8. As shown on Line No. 3, the resultant long-term historical equity risk premium on the market as a whole is 5.80%.

I used arithmetic mean return rates and yields (income returns) because they are appropriate for cost of capital purposes as noted in the SBBI – 2011. Arithmetic mean return rates and yields are appropriate because ex-post (historical) total returns and equity risk premiums differ in size and direction over time, providing insight into the variance and standard deviation of returns. Because the arithmetic mean captures the prospect for variance in returns and equity risk premiums, it provides the valuable insight needed by investors in estimating future risk when making a current investment. Absent such

valuable insight into the potential variance of returns, investors cannot meaningfully evaluate prospective risk. If investors alternatively relied upon the geometric mean of ex-post equity risk premiums, they would have no insight into the potential variance of future returns because the geometric mean relates the change over many periods to a constant rate of change, thereby obviating the year-to-year fluctuations, or variance, *critical to risk analysis.*

The financial literature is quite clear on this point, that risk is measured by the variability of expected returns, i.e., the probability distribution of returns.[22] In addition, Weston and Brigham[23] provide the standard financial textbook definition of the riskiness of an asset when they state:

> The riskiness of an asset is defined in terms of the *likely variability of future returns from the asset.* (emphasis added)

And Morin states[24]:

> The geometric mean answers the question of *what constant return* you would have to achieve in each year to have your investment growth match the return achieved by the stock market. The arithmetic mean answers the question of what growth rate is the best estimate of the future amount of money that will be produced by continually reinvesting in the stock market. It is the rate of return which, compounded over multiple periods, gives the mean of the probability distribution of ending wealth. (emphasis added)

In addition, Brealey and Myers[25] note:

> The proper uses of arithmetic and compound rates of return from past investments are often misunderstood. . . Thus the arithmetic average of

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22 Brigham (1989) 639.

23 Weston, J. Fred and Brigham, Eugene F., Essentials of Managerial Finance Third Edition (The Dryden Press, 1974) 272.

24 Morin 133.

25 Brealey and Myers 146-147.

> the returns correctly measures the opportunity cost of capital for investments. . . *Moral*: If the cost of capital is estimated from historical returns or risk premiums, use arithmetic averages, not compound annual rates of return. (italics in original)

Also, Giaacchino and Lesser[26] state:

> The appropriateness of using either a geometric or arithmetic mean depends on the context.[12](footnote omitted) If you are evaluating the past performance of a stock, the geometric mean is appropriate: it represents the compound average return over time.
>
> * * *
>
> If, instead, you wish to estimate future growth, you need to use an arithmetic mean . . . compounding the stock at the arithmetic mean . . . gives us the expected (average) stock price . . . compounding at the geometric mean leads to the median stock price.

As previously discussed, investors gain insight into relative riskiness by analyzing expected future variability. This is accomplished by the use of the arithmetic mean of a distribution of returns / premiums. Only the arithmetic mean takes into account all of the returns / premiums, hence, providing meaningful insight into the variance and standard deviation of those returns / premiums.

Q. Can it be demonstrated that the arithmetic mean takes into account all of the returns and therefore, that the arithmetic mean is appropriate to use when estimating the opportunity cost of capital in contrast to the geometric mean?

A. Yes. Pages 1 through 3 of Schedule PMA-9 graphically demonstrate this premise. It is clear from observing the year-to-year variation (the returns on large company stocks for each and every year, 1926 through 2010 on page 1), that stock market returns, and hence, equity risk premiums, vary.

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[26] Giaacchino, Leonardo R. and Lesser, Jonathan A., Principles of Utility Corporate Finance (Public Utilities Reports, Inc., 2011) 38-41 and 233-234.

There is a clear bell-shaped pattern to the probability distribution of these returns shown on page 2, an indication that they are randomly generated and not serially correlated. The arithmetic mean of this distribution of returns considers each and every return in the distribution, taking into account the standard deviation or likely variance which may be experienced in the future when estimating the rate of return based upon such historical returns. In contrast, page 3 demonstrates that when the geometric mean is calculated, only two of the returns are considered, namely the initial and terminal years, i.e., 1926 and 2010. Based upon only those two years, a constant rate of return is calculated by the geometric average. That constant return is graphically represented by a flat line, showing no year-to-year variation, over the entire 1926 to 2010 time period, which is obviously far different from reality, based upon the probability distribution of returns shown on page 2 and demonstrated on page 1.

Consequently, only the arithmetic mean takes into account the standard deviation of returns which is critical to risk analysis. The geometric mean is appropriate only when measuring historical performance and should not be used to estimate the investors required rate of return.

Q. How did you incorporate Value Line's forecasted total annual market return in excess of the prospective yield on high rated corporate bonds in your development of an equity risk premium for your RPM analysis?

A. Once again, because both ratemaking and the cost of capital, including the cost rate of common equity are prospective, a prospective market equity risk premium is essential. The basis of the forecasted or prospective market equity risk premium can be found on Line Nos. 4 through 6 on page 6 of Schedule PMA-8. Consistent with the development

of the dividend yield component of my DCF analysis, it is derived from an average of the most recent thirteen weeks ending July 8, 2011 3-5 year median market price appreciation potentials by Value Line plus an average of the median estimated dividend yield for the common stocks of the 1,700 firms covered in Value Line's Standard Edition as explained in detail in Note 1 on page 2 of Schedule PMA-10.

The average median expected price appreciation is 55% which translates to an 11.51% annual appreciation and, when added to the average (similarly calculated) median dividend yield of 1.93% equates to a forecasted annual total return rate on the market as a whole of 13.44%. The forecasted total market equity risk premium of 8.09% is derived by deducting the July 1, 2011 Blue Chip Financial Forecasts consensus estimate of about 50 economists of the expected yield on Moody's Aaa rated corporate bonds for the six calendar quarters ending with the fourth calendar quarter 2012 of 5.35% shown on Schedule PMA-8, page 6, Line No. 6 (8.09% = 13.44% - 5.35%).

In arriving at my conclusion of equity risk premium of 6.95% on Line No. 7 on page 6, I have given equal weight to the historical equity risk premium of 5.80% and the forecasted equity risk premium of 8.09% shown on Line Nos. 3 and 6, respectively (6.95% = (5.80% + 8.09%)/2).

Q. What is your conclusion of an equity risk premium for use in your RPM analysis?

A. On page 1 of Schedule PMA-10, the most current Value Line betas for the companies in the proxy group are shown. Applying the median beta of the proxy group of 0.70 (consistent with my reliance upon the median DCF results as previously discussed), to the market equity risk premium of 6.95% results in a beta adjusted equity risk premium of 4.87% for the proxy group of nine water companies.

A mean equity risk premium of 4.12% applicable to utilities with A rated public utility bonds such as the proxy group of nine water companies was calculated based upon holding period returns from a study using public utilities, as shown on Line No. 2, page 5 of Schedule PMA-8 and is detailed on page 8.

The equity risk premium applicable to the proxy group of nine water companies is the average of the beta-derived premium, 4.87%, and that based upon the holding period returns of public utilities with A rated bonds, 4.12%, as summarized on Schedule PMA-8, page 5, i.e., 4.50% (4.50% = (4.87% + 4.12%)/2).

Q. What is the indicated RPM common equity cost rate?

A. It is 10.33% for the nine water companies as shown on Schedule PMA-8, page 1.

Q. Some critics of the RPM model claim that its weakness is that it presumes a constant equity risk premium. Is such a claim valid?

A. No. The equity risk premium varies inversely with interest rate changes, although not in tandem with those changes. However, the presumption of a constant equity risk premium is no different than the presumption of a constant "g", or growth component, in the DCF model. If one calculates a DCF cost rate today, the absolute result "k", as well as the growth component "g", would invariably differ from a calculation made just one or several months earlier or later. This implies that "g" does change, although in the application of the standard DCF model, "g" is presumed to be constant. Hence, there is no difference between the RPM and DCF models in that both models assume a constant component, but in reality, these components, "g" and the equity risk premium both change.

As Morin[27] states with respect to the DCF model:

> It is not necessary that g be constant year after year to make the model valid. *The growth rate may vary randomly around some average expected value. Random variations around trend are perfectly acceptable, as long as the mean expected growth is constant.* The growth rate must be 'expectationally constant' to use formal statistical jargon. (italics added)

The foregoing confirms that the RPM is similar to the DCF model. Both assume an "expectationally constant" risk premium and growth rate, respectively, but in reality both vary (change) randomly around an arithmetic mean. Consequently, the use of the arithmetic mean, and not the geometric mean is confirmed as appropriate in the determination of an equity risk premium as discussed previously.

The Capital Asset Pricing Model (CAPM)

Q. Please explain the theoretical basis of the CAPM.

A. CAPM theory defines risk as the covariability of a security's returns with the market's returns as measured by beta ("β"). A beta less than 1.0 indicates lower variability while a beta greater than 1.0 indicates greater variability than the market.

The CAPM assumes that all other risk, i.e., all non-market or unsystematic risk, can be eliminated through diversification. The risk that cannot be eliminated through diversification is called market, or systematic, risk. In addition, the CAPM presumes that investors require compensation only for these systematic risks which are the result of macroeconomic and other events that affect the returns on all assets. The model is applied by adding a risk-free rate of return to a market risk premium, which is adjusted proportionately to reflect the systematic risk of the individual security relative to the total

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[27] Morin 256.

market as measured by beta. The traditional CAPM model is expressed as:

$$R_s = R_f + \beta(R_m - R_f)$$

Where: R_s = Return rate on the common stock

R_f = Risk-free rate of return

R_m = Return rate on the market as a whole

β = Adjusted beta (volatility of the security relative to the market as a whole)

Numerous tests of the CAPM have measured the extent to which security returns and betas are related as predicted by the CAPM confirming its validity. The empirical CAPM (ECAPM) reflects the reality that while the results of these tests support the notion that beta is related to security returns, the empirical Security Market Line (SML) described by the CAPM formula is not as steeply sloped as the predicted SML. Morin[28] states:

> With few exceptions, the empirical studies agree that ... low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than predicted.
>
> * * *
>
> Therefore, the empirical evidence suggests that the expected return on a security is related to its risk by the following approximation:
>
> $$K = R_F + x\,\beta(R_M - R_F) + (1-x)\,\beta(R_M - R_F)$$
>
> where x is a fraction to be determined empirically. The value of x that best explains the observed relationship Return = 0.0829 + 0.0520 β is between 0.25 and 0.30. If x = 0.25, the equation becomes:
>
> $$K = R_F + 0.25(R_M - R_F) + 0.75\,\beta(R_M - R_F)$$[29]

[28] Morin 175.

[29] Morin 190.

In view of theory and practical research, I have applied both the traditional CAPM and the ECAPM to the companies in the proxy group and averaged the results.

Q. Please describe your selection of a risk-free rate of return.

A. As shown in column 3 on page 1 of Schedule PMA-10, the risk-free rate adopted for both applications of the CAPM is 4.73%. Again, because both ratemaking and the cost of capital, including common equity, are prospective, the risk-free rate for my CAPM analysis is based upon the average consensus forecast of the reporting economists in the July 1, 2011 Blue Chip Financial Forecasts as shown in Note 2, page 2, of the expected yields on 30-year U.S. Treasury bonds for the six quarters ending with the fourth calendar quarter 2012.

Q. Why is the prospective yield on long-term U.S. Treasury Bonds appropriate for use as the risk-free rate?

A. The yield on long-term U.S. Treasury T-Bonds is almost risk-free and its term is consistent with the long-term cost of capital to public utilities measured by the yields on A rated public utility bonds, the long-term investment horizon inherent in utilities' common stocks, the long-term investment horizon presumed in the standard DCF model employed in regulatory ratemaking, and the long-term life of the jurisdictional rate base to which the allowed fair rate of return, i.e., cost of capital will be applied. In contrast, short-term U.S. Treasury yields are more volatile and largely a function of Federal Reserve monetary policy.

In addition, noted in the SBBI - 2011[30]:

[30] SBBI 2011 55.

> Although the equity risk premia of several horizons are available, the long-horizon equity risk premium is preferable for use in most business-valuation settings, even if an investor has a shorter time horizon. Companies are entities that generally have no defined life span; when determining a company's value, it is important to use a long-term discount rate because the life of the company is assumed to be infinite. For this reason, it is appropriate in most cases to use the long-horizon equity risk premium for business valuation.

Q. Please explain the estimation of the expected equity risk premium for the market.

A. The basis of the market equity risk premium is explained in detail in Note 1 on page 2 of Schedule PMA-10. It is derived from an average of the most recent thirteen weeks ending July 8, 2011 3-5 year median total market price appreciation projects from Value Line, resulting in a total annual return of 13.44% as discussed previously, and the long-term historical arithmetic mean total returns for the years 1926 – 2010 on large company stocks from the SBBI - 2011 of 11.90%. From these returns, the appropriate projected and historical risk-free rates are subtracted to arrive at a projected and historical equity risk premium for the market.

For example, the forecasted total market equity risk premium is derived by deducting the July 1, 2011 Blue Chip Financial Forecasts consensus estimate of about 50 economists of the expected yield on U.S. Treasury Notes of 4.73% from the Value Line projected total annual market return of 13.44%, resulting in a forecasted total market equity risk premium of 8.71%. From SBBI – 2011 historical total market return of 11.90%, the long-term income return on U.S. Government Securities of 5.20% was deducted resulting in an historical equity risk premium of 6.70% which results in an average total market equity risk premium of 7.71% (7.71% = (8.71% + 6.70%)/2).

Q. What are the results of your application of the traditional and empirical CAPM to

the proxy group?

A. As shown on Schedule PMA-10, page 1, the median traditional CAPM cost rate is 10.13% for the nine water companies and the median ECAPM cost rate is 10.71%. Consistent with my reliance upon the median DCF results discussed previously, I rely upon the median results of the traditional CAPM and ECAPM for the proxy group. Thus, as shown on column 6 on page 1, the CAPM cost rate applicable to the proxy group of nine water companies is 10.42% based upon an average of the traditional CAPM and ECAPM results for the proxy group.

Q. Some critics of the ECAPM model claim that using adjusted betas in a traditional CAPM amounts to using an ECAPM. Is such a claim valid?

A. No. Using adjusted betas in a CAPM analysis is not equivalent to the ECAPM. Betas are adjusted because of the general regression tendency of betas to converge toward 1.0 over time, i.e., over successive calculations of beta. As noted above, numerous studies have determined that the SML described by the CAPM formula at any given moment in time is not as steeply sloped as the predicted SML. Morin[31] states:

> Some have argued that the use of the ECAPM is inconsistent with the use of adjusted betas, such as those supplied by Value Line and Bloomberg. This is because the reason for using the ECAPM is to allow for the tendency of betas to regress toward the mean value of 1.00 over time, and, since Value Line betas are already adjusted for such trend [sic], an ECAPM analysis results in double-counting. This argument is erroneous. Fundamentally, the ECAPM is not an adjustment, increase or decrease, in beta. This is obvious from the fact that the expected return on high beta securities is actually lower than that produced by the CAPM estimate. The ECAPM is a formal recognition that the observed risk-return tradeoff is flatter than predicted by the CAPM based on myriad empirical evidence. The ECAPM and the use of adjusted betas comprised two separate features of asset pricing. Even if a company's beta is estimated accurately,

[31] Morin 191.

the CAPM still understates the return for low-beta stocks. Even if the ECAPM is used, the return for low-beta securities is understated if the betas are understated. Referring back to Figure 6-1, the ECAPM is a return (vertical axis) adjustment and not a beta (horizontal axis) adjustment. Both adjustments are necessary.

Moreover, the slope of the SML should not be confused with beta. As Brigham states[32] :

> The slope of the SML reflects the degree of risk aversion in the economy – the greater the average investor's aversion to risk, then (1) the steeper is the slope of the line, (2) the greater is the risk premium for any risky asset, and (3) the higher is the required rate of return on risky assets.[12]
>
> [12]Students sometimes confuse beta with the slope of the SML. This is a mistake. As we saw earlier in connection with Figure 6-8, and as is developed further in Appendix 6A, beta does represent the slope of a line, but *not* the Security Market Line. This confusion arises partly because the SML equation is generally written, in this book and throughout the finance literature, as $k_i = R_F + b_i(k_M - R_F)$, and in this form b_i looks like the slope coefficient and $(k_M - R_F)$ the variable. It would perhaps be less confusing if the second term were written $(k_M - R_F)b_i$, but this is not generally done.

Regulatory support for the ECAPM can be found in the New York Public Service Commission's Generic Financing Docket, Case 91-M-0509. Also, the Regulatory Commission of Alaska has stated[33]:

> Although we primarily rely upon Tesoro's recommendation, we are concerned, however, about Tesoro's CAPM analysis. Tesoro averaged the results it obtained from CAPM and ECAPM while at the same time providing empirical testimony[604] that the ECAPM results are more accurate then [sic] traditional CAPM results. The reasonable investor would be aware of these empirical results. Therefore, we adjust Tesoro's recommendation to reflect only the ECAPM result. (footnote omitted)

Thus, using adjusted betas in an ECAPM analysis is not incorrect nor inconsistent

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32 Brigham and Gapenski 203.

33 In the Matter of the Correct Calculation and Use of Acceptable Input Data to Calculate the 1997, 1998, 1999, 2000, 2001 and 2002 Tariff Rates for the Intrastate Transportation of Petroleum over the TransAlaska Pipeline System, Docket No P-97-4, Order No. 151, p. 146 (Reg. Comm'n AK 11/27/02).

with either their financial literature or regulatory precedent. Notwithstanding empirical and regulatory support for the use of only the ECAPM, my CAPM analysis, which includes both the traditional CAPM and the ECAPM, is a conservative approach resulting in a reasonable estimate of the cost of common equity.

Cost of Common Equity Models Applied to Comparable, Domestic, Non-Price Regulated Companies

Q. Please describe the basis of applying cost of common equity models to comparable risk, non-price regulated companies?

A. Applying cost of equity models to non-price regulated companies, comparable in total risk, is derived from the *"corresponding risk" standard* of the landmark cases of the U.S. Supreme Court, i.e., *Hope* and *Bluefield*, previously discussed. Therefore, it is consistent with the *Hope* doctrine that the return to the equity investor should be commensurate with returns on investments in other firms having corresponding risks based upon the fundamental economic concept of opportunity cost which maintains that the true cost of an investment is equal to the cost of the best available alternative use of the funds to be invested. The opportunity cost principle is also consistent with one of the fundamental principles upon which regulation rests: that regulation is intended to act as a surrogate for competition and to provide a fair rate of return to investors.

The first step in determining such an opportunity cost of common equity based upon the non-price regulated companies comparable in total risk to the nine water companies is to choose an appropriate proxy group(s) of non-price regulated firms comparable in total risk to the proxy group(s) of price-regulated utilities. The proxy group(s) should be broad-based in order to obviate any company-specific aberrations and

should exclude utilities to avoid circularity since the achieved returns on book common equity of utilities, being a function of the regulatory process, are substantially influenced by regulatory awards.

As stated previously, my selection criteria for the non-price regulated firms of comparable risk are based upon statistics derived from the market prices paid by investors. Value Line betas were used as a measure of systematic risk. The standard error of the regression was used as a measure of each firm's unsystematic or specific risk with the standard error of the regression reflecting the extent to which events specific to a company's operations affect its stock price. In essence, companies which have similar betas and standard errors of the regressions, have similar total investment risk, i.e., the sum of systematic (market) risk as reflected by beta and unsystematic (business and financial) risk, as reflected by the standard error of the regression. These statistics are derived from regression analyses using market prices which, under the EMH, reflect all relevant risks. An additional criterion used in the selection of these proxy companies were that they be domestic non-utility companies. The application of these criteria results in a proxy group of non-price regulated firms comparable in total risk to the average utility in the proxy group of water companies. The proxy group of thirty-nine non-utility companies comparable in total investment risk to the nine water companies is listed on page 3 of Schedule PMA-11.

Using a Value Line, Inc. proprietary database dated June 15, 2011, a proxy group of thirty-nine non-price regulated companies was chosen based upon ranges of unadjusted beta and standard error of the regression shown on page 2 of Schedule PMA-11. The ranges were based upon the standard deviations of the unadjusted beta and the average

standard error of the regression for the proxy group of nine water companies as explained on page 4 of Schedule PMA-11.

This selection criteria are meaningful and effectively respond to the criticisms normally associated with the selection of non-regulated firms presumed to be comparable in total risk. The criteria do so because the selection of non-price regulated companies comparable in total risk is based upon regression analyses of market prices which reflect investors' assessment of all risks, diversifiable and non-diversifiable, and is thus market-based.

The first method of measuring such an opportunity cost is shown in Schedule PMA-12. It measures the returns expected to be earned on the book common equity, net worth, or partner's capital of non-price regulated enterprises of comparable total risk as the nine water companies. The second method is to apply the DCF, RPM and CAPM to the same non-price regulated companies comparable in total risk to the nine water companies as shown on Schedule PMA-13.

Expected Return On Book Equity For The Proxy Group Of Domestic, Non-Price Regulated Companies

Q. Did you evaluate the expected return on book common equity, net worth, or partner's capital for the proxy group of domestic, non-price regulated companies that are comparable in total risk to the utility proxy group?

A. Yes. Measuring the expected return on book common equity, net worth, or partner's capital provides a direct measure of return, since it translates into practice the competitive principle upon which regulation rests. In my opinion, it is inappropriate to use the achieved returns of regulated utilities of similar risk because to do so would be circular, as

achieved returns are a function of authorized ROEs, i.e., the regulatory process itself, and inconsistent with the principle of equality of risk with non-price regulated firms. As shown on Schedule PMA-12, the expected rate of return on book equity, net worth, or partner's capital was gathered from Value Line's Standard Edition (various issues). After applying a test of significance (Student's t-statistic) to determine whether any of the projected returns are significantly different from the mean at the 95% confidence level, the projected return of one company has been excluded. After excluding this outlier, my conclusion of the expected return on book common equity net worth or partner's capital is 15.50%.

Cost Rates For The Proxy Group Of Domestic, Non-Price Regulated Companies Based Upon the DCF, RPM and CAPM

Q. Did you calculate common equity cost rates using the DCF, RPM and CAPM for the proxy group of domestic, non-price regulated companies that are comparable in total risk to the utility proxy group?

A. Yes. Because the DCF, RPM and CAPM have been applied in an identical manner as described previously relative to the market data of the nine water companies, I will not repeat the details of the rationale and application of each model shown in Schedule PMA-13. The only exception is that, in the application of the RPM, I did not use public utility-specific equity risk premiums.

Page 1 of Schedule PMA-13 contains the derivation of the DCF cost rates. As shown, the median DCF cost rate for the proxy group of thirty-nine non-price regulated companies comparable in total risk to the proxy group of nine water companies, is 12.05%.

Pages 2 through 4 contain information relating to the 11.38% RPM cost rate for the

proxy group of thirty-nine non-price regulated companies summarized on page 2. As shown on Line 1 of page 2 of Schedule PMA-13, the consensus prospective yield on Moody's Baa rated corporate bonds for the six quarters ending with the fourth quarter of 2012 from the July 1, 2011 Blue Chip Financial Forecasts is 6.17%, which is appropriate since the average Moody's bond rating of the proxy group of thirty-nine non-price regulated companies is Baa2 as shown on page 3 of Schedule PMA-13. When the risk premium of 5.21% derived on page 4 is added to the prospective Baa rated corporate bond yield of 6.17%, the indicated RPM cost rate is 11.38%. The average estimated equity risk premium is based upon the average of the historical and projected market risk premiums of 6.95%, adjusted by the group's median beta of 0.75, resulting in an equity risk premium of 5.21% as shown on Line 9, page 4 of Schedule PMA-13.

Page 5 contains the details of the application of the traditional CAPM and ECAPM to the thirty-nine non-price regulated companies comparable in total risk to the nine water companies. As shown, the median cost rates are 10.51% and 10.99%, respectively which, when averaged, results in an indicated CAPM cost rate of 10.75%.

Q. What are the cost rates, based upon the DCF, RPM and CAPM, related to the domestic, non-price regulated proxy group comparable in total risk to the utility proxy group?

A. The cost rates based upon application of the DCF, RPM and CAPM/ECAPM models to the non-utility group are 12.05%, 11.38% and 10.75%, respectively, averaging 11.39% as summarized on page 1 of Schedule PMA-11.

Q. What is your conclusion of the cost rate of common equity based upon the proxy group of thirty-nine non-price regulated companies comparable in total risk to the

nine water companies?

A. As shown on page 1 of Schedule PMA-11, my conclusion of the projected return on book equity, partner's capital or net worth of the comparable group is 15.50% and my conclusion is 11.39% for the results of the DCF, RPM and CAPM applied to the comparable group. Based upon these results, I conclude a cost of common equity of 13.45% for the non-price regulated companies.

Conclusion of Common Equity Cost Rate

Q. What is your recommended range of common equity cost rate?

A. It is 10.80% to 11.40% based upon the range of common equity cost rate resulting from the application of cost of common equity models to the nine water companies as well as a proxy group of non-utility companies comparable in total risk to the nine water companies, as adjusted for financial and business risks due to CWS's lower financial risk and smaller relative size.

As discussed previously, reliance upon multiple models is consistent with the EMH, upon which all of my models are premised. I employ all of my cost of common equity models as primary tools in arriving at my recommended common equity cost rate because; 1) no single model is so inherently precise that it can be relied upon solely to the exclusion of other theoretically sound models; 2) all of my models have application problems associated with them; 3) all of my models are based upon the Efficient Market Hypothesis (EMH); and 4) as demonstrated previously, the prudence of using multiple cost of common equity models is supported in both the financial literature and regulatory precedent. Therefore, none should be relied upon exclusively to estimate investors' required rate of return on common equity.

The results of my cost of common equity models applied to the nine water companies are shown on Schedule PMA-1, page 2 and summarized below:

Table 3

	Proxy Group of Nine Water Companies
Discounted Cash Flow Model	9.54%
Risk Premium Model	10.33
Capital Asset Pricing Model	10.42
Cost of Equity Models Applied to Comparable Risk, Non-Price Regulated Companies	13.45
Indicated Common Equity Cost Rate Before Adjustment for Financial Risk, Flotation Costs and Business Risks	10.40 – 11.00
Financial Risk Adjustment	(0.08) (0.08)
Business Risk Adjustment	0.50 0.50
Indicated Common Equity Cost Rate	10.82% 11.42%
Recommended Common Equity Cost Rate	10.80% 11.40%

Based upon these common equity cost rate results, I conclude that a common equity cost rate range of 10.40% to 11.00% is indicated for the nine water companies before the financial and business risk adjustments previously discussed, shown on Line Nos. 6 and 7 on page 2 of Schedule PMA-1.

Financial Risk Adjustment

Q. Is there a way to quantify a financial risk adjustment due to CWS's previously discussed lower financial risk relative to the proxy group?

A. Yes. As shown on page 1 of Schedule PMA-1, the Company's ratemaking common equity ratio at December 31, 2010 (there is no preferred stock) is 49.89% which is slightly higher than the average 2010 total equity ratio maintained, on average, by the nine water companies, 49.03%. Conversely, CWS's ratemaking long-term debt ratio at December 31, 2010, 50.11%, is slightly lower than the average 2010 long-term debt ratio of the proxy group, 50.97%. Thus, CWS has somewhat lower financial risk than the companies in the proxy group. Because investors require a higher return in exchange for bearing higher risk, a downward adjustment to the common equity cost rate derived from the market data of the proxy group companies which have a somewhat higher degree of financial risk than CWS is necessary.

An indication of the magnitude of the necessary financial risk adjustment is given by the Hamada equation[34], which un-levers and then re-levers betas based upon changes in capital structure.

The Hamada equation un-levers the median beta of the proxy group of nine water companies of 0.70 with an average December 31, 2010 common equity ratio of 49.03% to 0.42 when applied to a 100% common equity ratio and then levers the beta to 0.69 using CWS's ratemaking common equity ratio of 49.89% at December 31, 2010. The re-levered beta, applied to a 7.71% market risk premium and a 4.73% risk-free rate

[34] Brigham and Daves 533.

translates to a 10.05%[35] common equity cost rate. The difference between the 10.05% relevered beta common equity cost rate and the result of the traditional CAPM for the proxy group with a median beta of 0.70, 10.13%[36] is a negative 8 basis points (-0.08%). A downward financial adjustment of 8 basis points (0.08%), reflects the somewhat lower financial risk of CWS attributable to its higher ratemaking common equity ratio of 49.89% compared with the proxy group's average total equity ratio of 49.03% at December 31, 2010. The Hamada Equation and calculations are as follows:

$$b_l = b_u[1 + (1 - T)(D / S)]$$

Where b_l = Levered beta
b_u = Un-levered beta
T = Tax Rate
(D / S) = Debt to Common Equity Ratio

To un-lever the beta from a 49.03% average proxy group total equity ratio, the following equation is used:

$$0.70 = b_u [1 + (1 - 0.35) (50.97\%/49.03\%)]$$

When solved for b_u, b_u = 0.42, indicating that the beta for the proxy group of nine water companies would be 0.42 if their average capital structure contained 100% total equity.

To re-lever the beta relative to CWS's 52.51% for April 30, 2011 ratemaking common equity ratio, the following equation is used:

$$b_l = 0.42 [1 + (1 - 0.35) (50.11\%/49.89\%)]$$

When solved for b_l, b_l = 0.69, indicating that the beta for the proxy group of nine water companies would be 0.69, if their average capital structure contained 49.89% total equity.

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35 10.05% = (0.69 x 7.71%) + 4.73%.
36 10.13% = (0.70 x 7.71%) + 4.73%.

Business Risk Adjustment

Q. Is there a way to quantify a business risk adjustment due to CWS's small size relative to the proxy group?

A. Yes. As discussed previously, the Company has greater business risk than the average company in the proxy group because of its smaller size relative to the group, measured by either book capitalization or the market capitalization of common equity (estimated market capitalization for CWS, whose common stock is not traded).

Table 4

	Market Capitalization(1) ($ Millions)	Times Greater than the Company
CWS	$18.980	
Proxy Group of Nine Water Companies	1,194.619	62.9x

(1) From page 1 of Schedule PMA-14.

Because the Company's common stock is not publicly traded, I have assumed that if it were, the common shares would be selling at the same market-to-book ratio as the average market-to-book ratio for the proxy group, 175.8%, on July 6, 2011 as shown on page 2 of Schedule PMA-14. Since my recommended common equity cost rate is based upon the market data of the proxy group, it is reasonable to use the market-to-book ratios of the proxy group to estimate CWS's market capitalization. Hence, the Company's market capitalization is estimated at $18.980 million based upon the average market-to-book ratio of the proxy group. In contrast, the market capitalization of the average water company was $1.195 billion on July 6, 2011, or 62.9 times the size of CWS's estimated

market capitalization.

Therefore, it is necessary to upwardly adjust the common equity cost rate of 10.90% based upon the nine water companies to reflect CWS's greater risk due to its smaller relative size. The determination is based upon the size premiums for decile portfolios of New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ listed companies for the 1926-2010 period and related data from SBBI-2011. The average size premium for the decile in which the proxy group falls has been compared with the average size premium for the decile in which the market capitalization of CWS would fall if its stock were traded and sold at the July 6, 2011 average market/book ratio of 175.84% experienced by the proxy group. As shown on page 1, because CWS falls in the 10th decile and the nine water companies fall between the 6th and 7th deciles, the size premium spread between the Company and the nine water companies is 451 basis points (4.51%).

In view of the foregoing, an upward adjustment of 50 basis points (0.50%) to reflect CWS's greater relative business risk due to its smaller size. A business risk adjustment of 50 basis points (0.50%), coupled with the previously discussed financial risk adjustment of a negative 8 basis points (a negative 0.08%), when added to the range of indicated common equity cost rate of 10.40% to 11.00% based upon the nine water companies before adjustment, results in a financial and business risk-adjusted range of common equity cost rate of 10.82% to 11.42%[37] which, when rounded, results in a range of 10.80% to 11.40%, which is my recommendation.

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[37] 10.82% = 10.40% - 0.08% + 0.50% and 11.42% = 11.00% - 0.08% + 0.50%.

A range of common equity cost rate of 10.80% to 11.40%, when applied to the ratemaking common equity ratio of 49.89% at December 31, 2010, results in a range of overall rate of return of 8.70% to 9.00%. In my opinion, this range of overall rate of return is both reasonable and conservative, providing CWS with sufficient earnings to enable it to attract necessary new capital.

Q. Does that conclude your direct testimony?

A. Yes.

APPENDIX A

PROFESSIONAL QUALIFICATIONS

OF

PAULINE M. AHERN, CRRA
PRINCIPAL

AUS CONSULTANTS

PROFESSIONAL QUALIFICATIONS
OF
PAULINE M. AHERN, CRRA
PRINCIPAL
AUS CONSULTANTS

PROFESSIONAL EXPERIENCE

1994-Present

In 1996, I became a Principal of AUS Consultants, continuing to offer testimony as an expert witness on the subjects of fair rate of return, cost of capital and related issues before state public utility commissions. I provide assistance and support to clients throughout the entire ratemaking litigation process. In addition, I supervise the financial analyst and administrative staff in the preparation of fair rate of return and cost of capital exhibits which are filed along with expert testimony before various state and federal public utility regulatory bodies. The team also assists in the preparation of interrogatory responses, as well as rebuttal exhibits.

As the Publisher of AUS Utility Reports (formerly C. A. Turner Utility Reports), I am responsible for the production, publishing, and distribution of the reports. AUS Utility Reports provides financial data and related ratios for about 120 public utilities, i.e., electric, combination gas and electric, natural gas distribution, natural gas transmission, telephone, and water utilities, on a monthly, quarterly and annual basis. Among the subscribers of AUS Utility Reports are utilities, many state regulatory commissions, federal agencies, individuals, brokerage firms, attorneys, as well as public and academic libraries. The publication has continuously provided financial statistics on the utility industry since 1930.

As the Publisher of AUS Utility Reports, I also supervise the production, publishing, and distribution of the AGA Rate Service publications under license from the American Gas Association. I am also responsible for maintaining and calculating the performance of the AGA Index, a market capitalization weighted index of the common stocks of the approximately 70 corporate members of the AGA, which serves as the benchmark for the AGA Gas Index Fund.

As an Assistant Vice President from 1994 - 1996, I prepared fair rate of return and cost of capital exhibits which were filed along with expert testimony before various state and federal public utility regulatory bodies. These supporting exhibits include the determination of an appropriate ratemaking capital structure and the development of embedded cost rates of senior capital. The exhibits also support the determination of a recommended return on common equity through the use of various market models, such as, but not limited to, Discounted Cash Flow analysis, Capital Asset Pricing Model and Risk Premium Methodology, as well as an assessment of the risk characteristics of the client utility. I also assisted in the preparation of responses to any interrogatories received regarding such testimonies filed on behalf of client utilities. Following the filing of fair rate of return testimonies, I assisted in the evaluation of opposition testimony in order to prepare interrogatory questions, areas of cross-examination, and rebuttal testimony. I also evaluated and assisted in the preparation of briefs and exceptions following the hearing process. I also submitted testimony before state public utility commissions regarding appropriate capital structure ratios and fixed capital cost rates.

1990-1994

As a Senior Financial Analyst, I supervised two analysts and assisted in the preparation of fair rate of return and cost of capital exhibits which are filed along with expert testimony before various state and federal public utility regulatory bodies. The team also assisted in the preparation of interrogatory responses.

I evaluated the final orders and decisions of various commissions to determine whether further actions were warranted and to gain insight which assisted in the preparation of future rate of return studies.

I assisted in the preparation of an article authored by Frank J. Hanley and A. Gerald Harris entitled "Does Diversification Increase the Cost of Equity Capital?" published in the July 15, 1991 issue of Public Utilities Fortnightly.

In 1992, I was awarded the professional designation "Certified Rate of Return Analyst" (CRRA) by the National Society of Rate of Return Analysts (now the Society of Utility and Regulatory Financial Analysts

(SURFA)). This designation is based upon education, experience and the successful completion of a comprehensive examination.

As Administrator of Financial Analysis for AUS Utility Reports, which then reported financial data for over 200 utility companies with approximately 1,000 subscribers, I oversaw the preparation of this monthly publication, as well as the accompanying annual publication, Financial Statistics - Public Utilities.

1988-1990

As a Financial Analyst, I assisted in the preparation of fair rate of return studies including capital structure determination, development of senior capital cost rates, as well as the determination of an appropriate rate of return on equity. I also assisted in the preparation of interrogatory responses, interrogatory questions of the opposition, areas of cross-examination and rebuttal testimony. I also assisted in the preparation of the annual publication C. A. Turner Utility Reports - Financial Statistics -Public Utilities.

1973-1975

As a Research Assistant in the Research Department of the Regional Economics Division of the Federal Reserve Bank of Boston, I was involved in the development and maintenance of econometric models to simulate regional economic conditions in New England in order to study the effects of, among other things, the energy crisis of the early 1970's and property tax revaluations on the economy of New England. I was also involved in the statistical analysis and preparation of articles for the New England Economic Review. Also, I was Assistant Editor of New England Business Indicators.

1972

As a Research Assistant in the Office of the Assistant Secretary for International Affairs, U.S. Treasury Department, Washington, D.C., I developed and maintained econometric models which simulated the economy of the United States in order to study the results of various alternate foreign trade policies so that national trade policy could be formulated and recommended.

Clients Served

I have offered expert testimony before the following commissions:

Arkansas
California
Connecticut
Delaware
Florida
Hawaii
Idaho
Illinois
Indiana
Iowa
Kentucky
Louisiana
Maine
Maryland
Michigan
Missouri
Nevada
New Jersey
New York
North Carolina
Ohio
Pennsylvania
South Carolina
Virginia
Washington

I have sponsored testimony on generic/uniform methodologies for determining the return on common equity for:

Aquarion Water Company
The Connecticut Water Company
United Water Connecticut, Inc.
Utilities, Inc.

I have sponsored testimony on the rate of return and capital structure effects of merger and acquisition issues for:

California-American Water Company
New Jersey-American Water Company

I have sponsored testimony on fair rate of return and related issues for:

Alpena Power Company
Apple Canyon Utility Company
Applied Wastewater Management, Inc.
Aqua Illinois, Inc.
Aqua New Jersey, Inc.
Aqua North Carolina, Inc.
Aqua Virginia, Inc.
Aquarion Water Company
Artesian Water Company
The Atlantic City Sewerage Company
Audubon Water Company
The Borough of Hanover, PA
Carolina Pines Utilities, Inc.
Carolina Water Service, Inc. of NC
Carolina Water Service, Inc. of SC
The Columbia Water Company
The Connecticut Water Company
Consumers Illinois Water Company
Consumers Maine Water Company
Consumers New Jersey Water Company
City of DuBois, Pennsylvania
Elizabethtown Water Company
Emporium Water Company
GTE Hawaiian Telephone Inc.
Greenridge Utilities, Inc.
Illinois American Water Company
Iowa American Water Company
Water Services Corp. of Kentucky
Lake Wildwood Utilities Corp.
Land'Or Utility Company
Long Island American Water Company
Long Neck Water Company
Louisiana Water Service, Inc.
Massanutten Public Service Company
Middlesex Water Company
Missouri-American Water Company
Mt. Holly Water Company
Nero Utility Services, Inc.
New Jersey-American Water Company
Ohio-American Water Company
The Newtown Artesian Water Company
NRG Energy Center Pittsburgh LLC
NRG Energy Center Harrisburg LLC
United Water Idaho, Inc.
Penn Estates Utilities
Pinelands Water Company
Pinelands Waste Water Company
Pittsburgh Thermal
San Jose Water Company
Southland Utilities, Inc.
Spring Creek Utilities, Inc.
Sussex Shores Water Company
Tega Cay Water Service, Inc.
Total Environmental Services, Inc. – Treasure Lake Water & Sewer Divisions
Thames Water Americas
Tidewater Utilities, Inc.
Transylvania Utilities, Inc.
Trigen – Philadelphia Energy Corporation
Twin Lakes Utilities, Inc.
United Utility Companies
United Water Arkansas, Inc.
United Water Arlington Hills Sewerage, Inc.
United Water Connecticut, Inc.
United Water Delaware, Inc.
United Water Great Gorge Inc. / United Water Vernon Transmission, Inc.
United Water Idaho, Inc.
United Water Indiana, Inc.
United Water New Jersey, Inc.
United Water New Rochelle, Inc.
United Water New York, Inc.
United Water Owego / Nichols, Inc.
United Water Pennsylvania, Inc.
United Water Rhode Island, Inc.
United Water South County, Inc.
United Water Toms River, Inc.
United Water Vernon Sewage Inc.
United Water Virginia, Inc.
United Water Westchester, Inc.
United Water West Lafayette, Inc.
United Water West Milford, Inc.
Utilities, Inc.
Utilities Inc. of Central Nevada
Utilities, Inc. of Florida
Utilities, Inc. of Louisiana

(Testimony on Rate of Return Clients Continued)

Utilities, Inc. of Nevada
Utilities, Inc. of Pennsylvania
Utilities, Inc. - Westgate
Utilities Services of South Carolina
Utility Center, Inc.
Valley Energy, Inc.
Wellsboro Electric Company
Western Utilities, Inc.

I have sponsored testimony on capital structure and senior capital cost rates for the following clients:

Alpena Power Company
Arkansas-Western Gas Company
Associated Natural Gas Company
PG Energy Inc.
United Water Delaware, Inc.
Washington Natural Gas Company

I have assisted in the preparation of rate of return studies on behalf of the following clients:

Algonquin Gas Transmission Company
Anadarko Petroleum Corporation
Arkansas-Louisiana Gas Company
Arkansas Western Gas Company
Artesian Water Company
Associated Natural Gas Company
Atlantic City Electric Company
Bridgeport-Hydraulic Company
Cambridge Electric Light Company
Carolina Power & Light Company
Citizens Gas and Coke Utility
City of Vernon, CA
Columbia Gas/Gulf Transmission Cos.
Commonwealth Electric Company
Commonwealth Telephone Company
Conestoga Telephone & Telegraph Co.
Connecticut Natural Gas Corporation
Consolidated Gas Transmission Company
Consumers Power Company
CWS Systems, Inc.
Delmarva Power & Light Company
East Honolulu Community Services, Inc.
Equitable Gas Company
Equitrans, Inc.
Florida Power & Light Company
Gary Hobart Water Company
Gasco, Inc.
GTE Arkansas, Inc.
GTE California, Inc.
GTE Florida, Inc.
GTE Hawaiian Telephone
GTE North, Inc.
GTE Northwest, Inc.
GTE Southwest, Inc.
Great Lakes Gas Transmission L.P.
Hawaiian Electric Company
Hawaiian Electric Light Company
IES Utilities Inc.
Illinois Power Company
Interstate Power Company
Interstate Power & Light Co.
Iowa Electric Light and Power Company
Iowa Southern Utilities Company
Kentucky-West Virginia Gas Company
Lockhart Power Company
Middlesex Water Company
Milwaukee Metropolitan Sewer District
Mountaineer Gas Company
National Fuel Gas Distribution Corp.
National Fuel Gas Supply Corp.
Newco Waste Systems of NJ, Inc.
New Jersey Natural Gas Company
New Jersey-American Water Company
New York-American Water Company
North Carolina Natural Gas Corp.
Northumbrian Water Company
United Water Idaho, Inc.
Oklahoma Natural Gas Company
Orange and Rockland Utilities
Paiute Pipeline Company
PECO Energy Company
Penn Estates Utilities, Inc.
Penn-York Energy Corporation
Pennsylvania-American Water Co.
PG Energy Inc.
Philadelphia Electric Company
Providence Gas Company
South Carolina Pipeline Company
Southwest Gas Corporation
Stamford Water Company
Tesoro Alaska Petroleum Company
Tesoro Refining & Marketing Co.
United Telephone of New Jersey
United Utility Companies
United Water Arkansas, Inc.
United Water Delaware, Inc.

(Rate of Return Study Clients Continued)

United Water Idaho, Inc.
United Water Indiana, Inc.
United Water New Jersey, Inc.
United Water New York, Inc.
United Water Pennsylvania, Inc.
United Water Virginia, Inc.
United Water West Lafayette, Inc.
Utilities, Inc. of Pennsylvania
Utilities, Inc. - Westgate
Vista-United Telecommunications Corp.
Washington Gas Light Company
Washington Natural Gas Company
Washington Water Power Corporation
Waste Management of New Jersey – Transfer Station A
Wellsboro Electric Company
Western Reserve Telephone Company
Western Utilities, Inc.
Wisconsin Power and Light Company

EDUCATION:

1973 – Clark University – B.A. – Honors in Economics (Concentration: Econometrics and Regional/International Economics)
1991 – Rutgers University – M.B.A. – High Honors (Concentration: Corporate Finance)

PROFESSIONAL AFFILIATIONS:

American Finance Association
Financial Management Association
Society of Utility and Regulatory Financial Analysts
Member, Board of Directors – 2010-2012
President – 2006-2008 and 2008-2010
Secretary/Treasurer – 2004-2006
Energy Association of Pennsylvania
National Association of Water Companies – Member of the Finance/Accounting/Taxation Committee

SPEAKING ENGAGEMENTS:

"Public Utility Betas and the Cost of Capital", (co-presenter with Richard A. Michelfelder, Ph.D.) – Advanced Workshop in Regulation and Competition, 30th Annual Eastern Conference of the Center for Research in Regulated Industries (CRRI), May 20, 2011, Rutgers University, Skytop, PA.

Moderator: Society of Utility and Regulatory Financial Analysts: 43rd Financial Forum – "Impact of Cost Recovery Mechanisms on the Perception of Public Utility Risk", April 14-15, 2011, Washington, DC.

"A New Approach for Estimating the Equity Risk Premium for Public Utilities", (co-presenter with Richard A. Michelfelder, Ph.D.) – Hot Topic Hotline Webinar, December 3, 2010, Financial Research Institute of the University of Missouri.

"A New Approach for Estimating the Equity Risk Premium for Public Utilities", (co-presenter with Richard A. Michelfelder, Ph.D.) before the Indiana Utility Regulatory Commission Cost of Capital Task Force, September 28, 2010, Indianapolis, IN

Tomorrow's Cost of Capital: Cost of Capital Issues 2010, Deloitte Center for Energy Solutions, 2010 Deloitte Energy Conference, "Changing the Great Game: Climate, Customers and Capital", June 7-8, 2010, Washington, DC.

"Cost of Capital Issues – 2010" – Deloitte Center for Energy Solutions 2010 Energy Conference: Changing the Great Game: Climate, Consumers and Capital, June 7-8, 2010, Washington, DC

"A New Approach for Estimating the Equity Risk Premium for Public Utilities", (co-presenter with Richard A.

Michelfelder, Ph.D.) – Advanced Workshop in Regulation and Competition, 29th Annual Eastern Conference of the Center for Research in Regulated Industries (CRRI), May 20, 2010, Rutgers University, Skytop, PA

Moderator: Society of Utility and Regulatory Financial Analysts: 42nd Financial Forum – "The Changing Economic and Capital Market Environment and the Utility Industry", April 29-30, 2010, Washington, DC

"A New Model for Estimating the Equity Risk Premium for Public Utilities" (co-presenter with Richard A. Michelfelder, Ph.D.) – Spring 2010 Meeting of the Staff Subcommittee on Accounting and Finance of the National Association of Regulatory Utility Commissioners, March 17, 2010, Charleston, SC

"New Approach to Estimating the Cost of Common Equity Capital for Public Utilities" (co-presenter with Richard A. Michelfelder, Ph.D.) - Advanced Workshop in Regulation and Competition, 28th Annual Eastern Conference of the Center for Research in Regulated Industries (CRRI), May 14, 2009, Rutgers University, Skytop, PA

Moderator: Society of Utility and Regulatory Financial Analysts: 41st Financial Forum – "Estimating the Cost of Capital in Today's Economic and Capital Market Environment", April 16-17, 2009, Washington, DC

"Water Utility Financing: Where Does All That Cash Come From?", AWWA Pre-Conference Workshop: Water Utility Ratemaking, March 25, 2008, Atlantic City, NJ

PAPERS:

"Public Utility Beta Adjustment and the Cost of Capital", co-authored with Richard A. Michelfelder, Ph.D. and Panayiotis Theodossiou, Ph.D.

"A New Approach for Estimating the Equity Risk Premium for Public Utilities", co-authored with Frank J. Hanley and Richard A. Michelfelder, Ph.D. (forthcoming in The Journal of Regulatory Economics).

"Comparable Earnings: New Life for an Old Precept" co-authored with Frank J. Hanley, Financial Quarterly Review, (American Gas Association), Summer 1994.